NOTE

This Microfiche meets the quality requirements of the American National Standard for Microfiche of Documents (ANSI PH5.9-1975). However, because of imperfections in the document from which it was made, it contains images that are illegible or difficult to read. The source document for this microfiche is the best copy that could be obtained prior to filming.

CIS Congressional Information Service, Inc.
Washington, D.C.

Calendar No. 593

101ST CONGRESS *2d Session*	SENATE	REPORT 101-321

MAGNETIC LEVITATION TRANSPORTATION ACT OF 1990

Mr. HOLLINGS, from the Committee on Commerce, Science, and Transportation, submitted the following

REPORT

OF THE

SENATE COMMITTEE ON COMMERCE SCIENCE, AND TRANSPORTATION

ON

S. 2286

JUNE 8 (legislative day, APRIL 18), 1990.—Ordered to be printed

---

U.S. GOVERNMENT PRINTING OFFICE

39-010 WASHINGTON : 1990

S263-10

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ERNEST F. HOLLINGS, South Carolina, *Chairman*

DANIEL K. INOUYE, Hawaii
WENDELL H. FORD, Kentucky
J. JAMES EXON, Nebraska
ALBERT GORE, JR., Tennessee
JOHN D. ROCKEFELLER IV, West Virginia
LLOYD BENTSEN, Texas
JOHN F. KERRY, Massachusetts
JOHN B. BREAUX, Louisiana
RICHARD H. BRYAN, Nevada
CHARLES S. ROBB, Virginia

JOHN C. DANFORTH, Missouri
BOB PACKWOOD, Oregon
LARRY PRESSLER, South Dakota
TED STEVENS, Alaska
ROBERT W. KASTEN, JR., Wisconsin
JOHN McCAIN, Arizona
CONRAD BURNS, Montana
SLADE GORTON, Washington
TRENT LOTT, Mississippi

KEVIN G. CURTIN, *Chief Counsel and Staff Director*
WALTER B. MCCORMICK, JR., *Minority Chief Counsel and Staff Director*

Calendar No. 593

101ST CONGRESS
2d Session

SENATE

REPORT
101-321

MAGNETIC LEVITATION TRANSPORTATION ACT OF 1990

JUNE 8 (legislative day, APRIL 18), 1990.—Ordered to be printed

Mr. HOLLINGS, from the Committee on Commerce, Science, and Transportation, submitted the following

REPORT

[To accompany S. 2286]

The Committee on Commerce, Science, and Transportation, to which was referred the bill (S. 2286) to require the Secretary of Transportation to lead and coordinate Federal efforts in the development of magnetic levitation transportation technology and foster implementation of a magnetic levitation transportation system, having considered the same, reports favorably thereon with an amendment in the nature of a substitute and recommends that the bill as amended do pass.

PURPOSE OF THE BILL

The bill, as reported, would authorize $50 million in funding for each of fiscal years (FY) 1991 and 1992 to be used by the Secretary of Transportation (Secretary) to establish a cooperative funding program with industry to develop magnetically levitated transportation systems (maglev). Such a program would be directed toward research, development, and implementation of maglev in the United States and the promotion of a domestic maglev industry. The bill also would establish a High-Speed Ground Transportation Office within the Federal Railroad Administration (FRA).

BACKGROUND AND NEEDS

In 1965, Congress enacted the High-Speed Ground Transportation Act, which established the Office of High Speed Ground Transportation (OHSGT) under the Department of Commerce [the law predated the creation of the Department of Transportation (DOT)] and authorized research and development in this area. The objectives of the Act included advancing rail technology as rapidly as

possible and exploring technologies for new modes of intercity ground transportation.

In an effort to improve rail passenger service, the OHSGT awarded a contract in 1965 for a demonstration of 150 miles per hour (mph) high-speed rail passenger service in the Northeast Corridor between New York and Washington. These cars, known as the Metroliners, began service in January 1969. The OHSGT was transferred to DOT when it was created in 1967. OHSGT functions later were merged into FRA's Office of Research and Development. The FRA was involved in much of the original maglev transportation research.

Maglev transportation involves the suspension, guidance, and propulsion of a vehicle by magnetic forces. The absence of contact between the vehicle and its guideway allows for speeds up to 300 mph and virtually no roadbed maintenance.

Maglev transportation differs from the high-speed wheel-on-rail trains currently operational in Europe and Japan. These trains, such as the French TGV, can reach speeds over 180 mph but produce more wear on the tracks due to the constant contact of the train with the track.

Currently, there are two types of maglev transportation: electromagnetic and superconducting. In electromagnetic maglev, the clearance between the vehicle and the guideway is typically ⅜ of an inch while the clearance in superconducting maglev is closer to 6 inches. In order to maintain the narrow clearance in electromagnetic maglev, the electrical current supplied must be constantly monitored. Superconducting maglev, which is considered simpler and less expensive to construct, involves the interaction of magnets mounted on the vehicle with guideways constructed of metal, usually aluminum.

During the 1960s and 1970s, maglev was pioneered by the United States but only developed to the prototype scale model stage. In 1975, U.S. efforts were abandoned due to a lack of Federal funding. Since that time, although neither has a maglev system in revenue service, Japan and West Germany have spent $1 billion each developing prototypes which have carried passengers on test runs.

The Rail Safety Improvement Act of 1988, Pub Law 100-342, clarified the jurisdiction of DOT and the FRA over the safety components of high-speed rail by defining "railroad" to include all forms of non-highway ground transportation that run on rails or electromagnetic guideways, except for rapid transit operations within an urban area that are not connected to a general railroad system. The term "railroad" thus includes certain commuter and other short-haul rail passenger service and intercity high-speed ground transportation systems without regard to whether they use new or traditional technologies.

This year, for the first time since the mid-1970's, the Administration is supporting funding for high-speed rail and maglev systems. The President's budget for FY 1991 has proposed $6.2 million for the FAR and $3.5 million for the Army Corps of Engineers for research and development related to such systems.

In announcing the Statement of National Transportation Policy in February 1990, President Bush mentioned maglev as a promising transportation technology to help meet our intercity passenger

transportation needs. The National Transportation Policy indicates that the Federal Government will promote research to support a spectrum of new transportation options, including high-speed rail and maglev, by providing seed money for the initial examination of the feasibiity and cost effectiveness of such major new technologies in comparison to other options. The National Transportation Policy further states that "while private investment will be the central feature in putting any of these systems into place, the Federal Government can serve as the catalyst and ensure that regulatory and institutional barriers do not impede implementation of viable systems."

Significant interest exists in the United States for the use of maglev, with projects in the State of Florida, between California and Nevada, and in Pittsburgh, Pennsylvania, being the most advanced. Although the first maglev systems built and operated in the United States likely will use German or Japanese technology, the success of these projects will help pave the way for future system development using American technologies. Initially, the Committee anticipates that American companies participating in these projects will gain valuable experience in the design and construction of maglev guideways, which is the most costly portion of system implementation.

The CJommittee believes, however, that all aspects of the next generation of maglev can be American-designed and built. The development of an American maglev industry would provide jobs and stimulate economic growth and competitiveness, as well as provide a more energy-efficient transportation alternative. A shared partnership between industry and government will boost the pace of domestic maglev research and development and move the United States more rapidly to the implementation stage. U.S. industry has shown a significant interest in participating in the development of maglev systems.

Legislative History

On March 9, 1990, Senator Hollings introduced S. 2286, the Magnetic Levitation Transportation Act of 1990. Among cosponsors of the bill are Senator Exon and Breaux.

The Surface Transportation Subcommittee has held two hearings on maglev. The first hearing, on October 17, 1989, explored the subject of Advanced Transportation Systems—both maglev and high-speed rail. The second hearing, on March 21, 1990, considered S. 2286, and also S. 1898, the Mag-Lev Guarantee Pilot Progam Act introduced by Senator Reid. During both of the hearings, the Subcommittee heard from Senator Reid, the FRA, and several witnesses, including one of the inventors of maglev technology, representatives of organizations involved in developing and applying maglev technology and/or constructing maglev systems in the United States, and companies involved in developing and building transportation systems.

On April 3, 1990, the Committee met in open executive session to consider an amendment in the nature of a substitute to S. 2286. By voice vote, S. 2286 as amended was ordered reported without objection.

Summary of Major Provisions

This legislation is directed toward research, development, and implementation of maglev in the United States and seeks to promote a domestic maglev industry.

As reported, S. 2283 would:

1. require the Secretary, in consultation with the Secretaries of Commerce, Energy, and Defense, the Administrator of the Environmental Protection Agency CEPA, and heads of other interested agencies, to lead and coordinate Federal efforts to develop maglev technologies and foster their implementation;
2. require the Secretary to enter into cooperative research and development agreements and funding agreements with U.S. companies to conduct research to overcome techical and other barriers to the development and construction of maglev systems;
3. provide for the transfer of research and basic generic technologies to industry to promote the commercial U.S. maglev industry;
4. provide up to 50 percent of the cost of any project under any cooperative research and development agreement and/or funding agreement entered into with industry;
5. require DOT to report to Congress on the research and development transfer activities;
6. authorize funding levels of $50 million in FY 1991 and $50 million in FY 1992 to carry out the provisions of the legislation; and
7. establish a High-Speed Ground Transportation Office within the FRA to develop national uniform standards for high-speed rail and maglev system technology, regulate the design and construction of these systems to ensure conformity with standards of technology, safety, and environmental quality, and make recommendations for legislative and administrative action necessary to facilitate these projects.

Estimated Costs

In accordance with paragraph 11(a) of rule XXVI of the Standing Rules of the Senate and section 403 of the Congressional Budget Act of 1974, the Committee provides the following cost estimate, prepared by the Congressional Budget Office:

U.S. Congress,
Congressional Budget Office,
Washington, DC, April 11, 1990.

Hon. Ernest F. Hollings,
Chairman, Committee on Commerce, Science and Transportation, U.S. Senate, Washington, DC.

Dear Mr. Chairman: The Congressional Budget Office has prepared the attached cost estimate for S. 2286, the Magnetic Levitation Transportation Act of 1990.

If you wish further details on this estimate, we will be pleased to provide them.

Sincerely,

ROBERT D. REISCHAUER,
Director.

CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

1. Bill number: S. 2286.

2. Bill title: The Magnetic Levitation Transportation Act of 1990.

3. Bill status: As ordered reported by the Senate Committee on Commerce, Science, and Transportation, April 3, 1990.

4. Bill purpose: S. 2286 would direct the Secretary of Transportation to lead and coordinate federal efforts to develop magnetic levitation transportation. Towards this goal, the bill would authorize the Secretary to enter into cooperative research and development agreements and funding agreements with U.S. companies, and would authorize appropriations of $50 million in each of the fiscal years 1991 and 1992.

In addition, the bill would establish a High-Speed Ground Transportation Office within the Federal Railroad Administration. This new office would be responsible for establishing uniform national standards and regulating the design and construction of regional high-speed transportation systems.

5. Estimated cost to the Federal Government:

[By fiscal year, in millions of dollars]

	1991	1992	1993	1994	1995
Authorization level	50	50			
Estimated outlays	10	50	20	15	5

The costs of this bill fail within budget function 400.

In addition to the activities covered by these authorizations, the Department of Transportation would incur costs of about $500,000 per year to carry out its expanded administrative responsibilities under this legislation.

Basis of estimate: CBO assumed that the full amounts authorized would be appropriated. The outlay estimate is based on historical spending rates for similar programs.

6. Estimated cost to State and local governments: None.

7. Estimate comparison: None.

8. Previous CBO estimate: None.

9. Estimate prepared by: Marjorie Miller.

10. Estimate approved by: C.G. Nuckols, for James L. Blum, Assistant Director for Budget Analysis.

REGULATORY IMPACT STATEMENT

In accordance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee provides the following evaluation of the regulatory impact of the legislation, as reported.

Number of Persons Covered

This legislation would provide an authorization of appropriations for FY 1991 and 1992 to enable DOT to establish a maglev cooperative funding program with industry. Participation in the funding program by companies and organizations that choose to develop maglev systems would be voluntary. However, the legislation would require the FRA to regulate the design and construction standards developed in an effort to ensure safety.

Ridership projections for any maglev systems that would be constructed as a result of this legislation are speculative at this time.

Economic Impact

Section 5 of the reported bill would authorize appropriations of $50 million for FY 1991 and $50 million for FY 1992 to establish a DOT maglev cooperative funding program. These funding levels would allow the Secretary to fund up to 50 percent of the cost of any project participating under an agreement authorized pursuant to this legislation. There likely would be some additional costs incured by the FRA in establishing a High-Speed Ground Transportation Office and carrying out the functions specified under this legislation. However, the funding needs would be modest and are not expected to have an inflationary impact on the Nation's economy.

Privacy

This legislation would not have any adverse impact on the personal privacy of the individuals affected.

Paperwork

The Committee does not foresee a significant increase in the current level of paperwork as a result of this legislation. However, some additional paperwork would be involved as DOT would be required to review proposals from industry groups seeking to enter into cooperative funding arrangements for maglev development. Additionally, companies or groups planning to construct maglev systems would be required to submit design and consturction plans to the FRA in order to ensure conformity with technology, safety, and environmental quality standards.

Section-by-Section Analysis

SECTION 1.—SHORT TITLE

This section provides that the legislation is to be entitled the "Magnetic Levitation Transportation Act of 1990."

SECTION 2.—FINDINGS

This section recognizes a number of factors that make maglev attractive as a transportation alternative, such as the fact that our current transportation network is facing increasing demands and limited capacity, and maglev is an energy-efficient, high-speed technology with the potential to supplement existing transportation modes, increase system capacity, and support economic growth. If the benefits of maglev technology are to be realized, however, coop-

erative research and development efforts among industry, the academic community, and government must be encouraged. DOT, in cooperation with other interested agencies, should take the lead in strengthening the Federal effort to advance maglev systems within the United States.

SECTION 3—RESEARCH AND DEVELOPMENT

This section would amend the High-Speed Ground Transportation Act of 1965 by adding a new subsection (b) to the first section to provide the Secretary with authority to lead and coordinate the Federal effort to foster the development of maglev technologies and the implementation of maglev systems. In performing this function, the Secretary is to consult with the Secretaries of Commerce, Energy, and Defense, and the EPA Administrator. This section recognizes that DOT first became involved with maglev as a result of the High-Speed Ground Transportation Act of 1965. As a result of that Act, DOT funded a wide range of research into all forms of high-speed ground transportation. In recent years, DOT has funded feasibility studies by States considering maglev systems and has been the catalyst for many efforts to define the potential for such systems.

The Committee believes that DOT is best suited to coordinate the Federal maglev initiative and foster implementation of this transportation alternative. Within DOT, issues of safety, highway rights-of-way, and potential airport connections can be addressed. Several other Federal agencies have been involved in maglev technology, including the Department of Energy, in developing superconducting technologies; the Army Corps of Engineers, within the Department of Defense, as it relates to overcoming construction barriers; the Department of Commerce; and EPA. The Committee directs the Secretary to coordinate and cultivate the relationships already established with the various Federal agencies.

SECTION 4.—COOPERATIVE AGREEMENTS AND FUNDING AGREEMENTS

This section would amend the High-Speed Ground Transportation Act by adding a new section 4. Section 4(a), gives the Secretary authority to enter into cooperative research and development agreements (CRADAs) (as defined under section 12 of the Stevenson-Wydler Technology Innovation Act of 1980), and one or more funding agreements (as defined by section 201(b) of title 35, U.S. Code), with U.S. companies. These CRADAs and funding agreements would be entered into in order to conduct research to overcome technical and other barriers to the development and construction of maglev and to transfer that research and basic generic technologies to industry. The purpose of these agreements would be to help stimulate a commercial maglev industry within the United States.

The Committee envisions that the Secretary would determine, with assistance from the director of any Government-operated Federal laboratory, which CRADAs to enter into with other Federal agencies; units of State and local government; industrial organizations (including corporations, partnerships, and limited partnerships, and industrial development organizations); public and pri-

vate foundations; nonprofit organizations (including universities); or other persons (including licensees of inventions owned by the Federal agency). The Department's Transportation Systems Center in Cambridge, Massachusetts, is a Federal laboratory with the demonstrated capability of performing research and development activities pursuant to this legislation. It is, however, the intent of the Committee to provide the Secretary with sufficient flexibility to contract with any Federal laboratory, as the Secretary considers appropriate.

In addition to the CRADA mechanism, the Secretary is authorized to enter into one or more funding agreements which do not require the participation of a Federal laboratory. Under a funding agreement, the non-Federal recipient of Federal funds automatically gets the right to ownership of any patentable inventions resulting from research conducted under the agreement. By comparison, under a CRADA, the disposition of rights is negotiated. The Federal laboratory may agree to give up its ownership rights, or to grant licensing rights in advance.

The intent of the Committee is to allow the Secretary clear authority to commit Federal funds to maglev research and development both within and outside of the Federal laboratory environment. The Committee believe the use of funding agreements would provide additional incentives for private industry to participate in the maglev research and development process.

Subsection (b) of new section 4 allows the Secretary to provide up to 50 percent of the costs of any project under an agreement reached pursuant to subsection (a). This subsection requires that at least 5 percent of the non-Federal entity's share of any project must be paid in cash.

Subsection (c) specifies that the research, development, or utilization of any technology that results from a cooperative agreement, as detailed in subsection (a), would be subject to the provisions of the Stevenson-Wydler Technology Innovation Act of 1980. Also included would be the terms by which this technology may be licensed and any resulting royalties distributed.

Subsection (d) provides that the research, development, or utilization of any technology resulting from a funding agreement, including licensing and ownership rights, would be subject to chapter 18 of title 35, U.S. Code.

Subsection (e) requires the Secretary to provide reports to Congress at the end of FY 1991 and FY 1992 on research and technology transfer activities conducted as a result of subsection (a).

SECTION 5.—AUTHORIZATION OF APPROPRIATIONS

This section amends section 11 of the High-Speed Ground Transportation Act to authorize appropriations to the Secretary of $50 million for FY 1991 and $50 million for FY 1992, to use in entering into cooperative funding agreements for the purpose of assisting in the development of magnetic levitation transportation systems.

SECTION 6.—HIGH-SPEED GROUND TRANSPORTATION OFFICE

This section adds at the end of section 103 of title 49, U.S. Code, a new subsection (e), which would establish within the FRA a High-

Speed Ground Transportation Office, headed by a Director who would report to the Administrator. This Office would be responsible for establishing national uniform standards for high-speed rail and maglev technology; regulating the design and construction of regional high-speed transportation systems to ensure that they conform to national standards on technology, safety, and environmental quality; and annually recommending legislative and administrative action that may be necessary to facilitate maglev projects. The FRA was made responsible for establishing and enforcing maglev safety standards under the Rail Safety Improvement Act of 1988. This section expands upon that authority.

SECTION 7.—DEFINITION

This section clarifies, for the purposes of this legislation, that the term "High-Speed Ground Transportation Act" refers to the Act entitled "An Act to authorize the Secretary of Commerce to undertake research and development in high-speed ground transportation, and for other purposes," which was approved September 30, 1965 (P.L. 89–220; 79 Stat. 893).

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new material is printed in italic, existing law in which no change is proposed is shown in roman):

HIGH-SPEED GROUND TRANSPORTATION ACT

FIRST SECTION OF THAT ACT

That, *(a)* consistent with the objective of promoting a safe, adequate, economical, and efficient national transportation system, the Secretary of Transportation (hereafter in this Act referred to as the "Secretary") is authorized to undertake research and development in highspeed ground transportation and door-to-door ground transportation, including, but not limited to, components such as materials, aerodynamics, vehicle propulsion, vehicle control, communications, and guideways.

(b) Pursuant to the authority under subsection (a) to undertake research and development in high-speed ground transportation, the Secretary, in consultation with the Secretaries of Commerce, Energy, and Defense, the Administrator of the Environmental Protection Agency, and the heads of other interested agencies, shall lead and coordinate Federal efforts in the development of magnetic levitation (Maglev) transportation technologies and foster its implementation as an alternative transportation system.

SECTION 3 OF THAT ACT

SEC. 3. * * *

SEC. 4. (a) In carrying out the responsibilities of the Secretary under the first section, the Secretary of Transportation is authorized to enter into one or more cooperative research and development agreements (as defined by section 12 of the Stevenson-Wydler Tech-

nology Innovation Act of 1980, 15 U.S.C. 3710a), and one of more funding agreements (as defined by section 201(b) of title 35, United States Code), with United States companies for the purpose of—

(1) conducting research to overcome technical and other barriers to the development and construction of practical magnetic levitation transportation systems and to help create the basic generic technologies needed for these systems; and

(2) transferring that research and basic generic technologies to industry in order to help create a viable commercial magnetic levitation transportation industry within the United States.

(b) In a cooperative agreement or funding agreement under subsection (a), the Secretary may agree to provide not more than 50 percent of the cost of any project under the agreement. Not less than 5 percent of the non-Federal entity's share of the cost of any such project shall be paid in cash.

(c) The research, development, or utilization of any technology pursuant to a cooperative agreement under subsection (a), including the terms under which such technology may be licensed and the resulting royalties may be distributed, shall be subject to the provisions of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.).

(d) The research, development, or utilization of any technology pursuant to a funding agreement under subsection (a), including the determination of all licensing and ownership rights, shall be subject to the provisions of chapter 18 of title 35, United States Code.

(e) At the conclusion of fiscal year 1991 and again at the conclusion of fiscal year 1992 the Secretary shall submit reports to Congress regarding research and technology transfer activities conducted pursuant to the authorization contained in subsection (a).

SECTION 11 OF THAT ACT

[SEC. 11. There are hereby authorized to be appropriated such sums as may be necessary to carry out the provisions of this act, but not to exceed $20,000,000 for the fiscal year ending June 30, 1966; $35,000,000 for the fiscal year ending June 30, 1967; $35,000,000 for the fiscal year ending June 30, 1968; $16,200,000 for the fiscal year ending June 30, 1969; $21,200,000 for the fiscal year ending June 30, 1970; $21,700,000 for the fiscal year ending June 30, 1971; $97,000,000 for the fiscal year ending June 30, 1973; $126,000,000 for the fiscal year ending June 30, 1974; and $92,900,000 for the fiscal year ending June 30, 1975. Such sums shall remain available until expended.]

SEC. 11. There are authorized to be appropriated to the Secretary $50,000,000 for fiscal year 1991 and $50,000,000 for fiscal year 1992, to carry out the provisions of this Act relating to magnetic levitation transportation.

TITLE 49, UNITED STATES CODE

SECTION 103 OF THAT TITLE

§ 103. Federal Railroad Administration.

(a) through (d) * * *

(e) There is established within the Administration the High-Speed Ground Transportation Office, which shall be headed by a Director, who shall report to the Administrator. It shall be the function of the Office to—

(1) establish national uniform standards for high-speed rail and magnetically levitated transportation system technology;

(2) regulate the design and construction of regional high-speed transportation systems to ensure that they conform to national standards on technology, safety, and environmental quality; and

(3) on an annual basis make recommendations for such legislative or administrative action as may be necessary to facilitate such projects.

○